In step **1190**, method **1100** applies a sigmoid non-linearity to each component of the normalized contrast pyramid in accordance with equations (40–41) to produce a transducer output. The transducer output represents a compressed, normalized contrast pyramid for each image in the input image sequence.

In step **1195**, method **1100** applies a pooling operation to the transducer outputs from step **1190**. The pooling operation averages the energy response over a small neighborhood by convolving with a disc-shaped kernel of a certain diameter size. For stimulus eccentricities inside of the fovea, the "foveal" diameter is set at 5. For stimulus eccentricities outside of the fovea, the diameter d_p is calculated in accordance with equation (42). After the pooling operation, each spatial position of each image is equivalent to an m-dimensional vector.

In step **1197**, the distance between these vectors for two corresponding input images is calculated. Smaller pyramid levels are upsampled to the full 512×512 size and the distance is calculated in accordance with equation (43) and FIG. **10** to produce a spatial array of distance values.

In step **1198**, the spatial array of distance values can be used to generate various image metrics such as a probability prediction. Method **1100** then ends in step **1199**.

There has thus been shown and described a novel method and apparatus for assessing the visibility of differences between two input image sequences for improving image fidelity and visual task applications. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention, which is to be limited only by the claims which follow.

What is claimed is:

1. Apparatus for assessing visibility of differences between two input image sequences having a plurality of input images, where each of said input images contains a chrominance component, said apparatus comprising:

a temporal filter for filtering the chrominance components of each of the input image sequences into a lowpass temporal response; and

a spatial discriminator, coupled to said temporal filter, for generating an image metric from said lowpass temporal responses.

2. The apparatus of claim **1**, wherein each of said input images further contains a luminance component, wherein said temporal filter filters said luminance components of each of the input image sequences into a second lowpass temporal response and a bandpass temporal response, wherein said spatial discriminator generates an image metric from said lowpass and bandpass temporal responses from both the luminance and chrominance components of the input image sequences.

3. The apparatus of claim **2**, further comprises:

a retinal sampler, coupled to said temporal filter, for sampling each of the input image sequences to produce a retinal sampled image sequence, where said input image sequence to said temporal filter is said retinal sampled image sequence.

4. The apparatus of claim **3**, wherein said retinal sampler comprises:

a frame adjuster for resampling each of the input image sequences to produce a frame adjusted image sequence;

a first sampler, coupled to said frame adjuster, for resampling said frame adjusted image sequence to produce an angular subtended image sequence;

a border inserter, coupled to said first sampler, for inserting a border around each image of said angular subtended image sequence;

a second sampler, coupled to said border inserter, for resampling said bordered image sequence from said border inserter to produce a smoothed/interpolated image sequence; and

a convolver, coupled to said second sampler, for approximating optics of a human eye to produce said retinal sampled image sequence.

5. The apparatus of claim **2**, wherein said temporal filter comprises:

a first temporal filter, coupled to said spatial discriminator, for filtering the chrominance components of the first input image sequence; and

a second temporal filter, coupled to said spatial discriminator, for filtering the chrominance components of the second input image sequence.

6. The apparatus of claim **5**, wherein said temporal filter further comprises:

third and fourth temporal filters, coupled to said spatial discriminator, for filtering the luminance components of the first input image sequence; and

fifth and sixth temporal filters, coupled to said spatial discriminator, for filtering the luminance components of the second input image sequence.

7. The apparatus of claim **6**, wherein said temporal filters are expressed as:

$$J_n'(x,j)=\sum_{cj-N(n)}^{cj} I_D(x,k\Delta t)H^{(n)}(j\Delta t_1-k\Delta t),$$

where $c=\Delta t_1/\Delta t$, $N(1)=(a\Delta t)^{-1}\ln(1000)$, $N(2)=15(b\Delta t)^{-1}$ and $(n=1,2)$ where n=1 correlates said lowpass temporal response and where n=2 correlates said bandpass temporal response.

8. The apparatus of claim **2**, wherein said spatial discriminator comprises:

a contrast transform for computing a contrast pyramid having a plurality of levels for each image of said lowpass and bandpass temporal responses; and

a gain control, coupled to said contrast transform, for applying cross masking of visual threshold to said contrast pyramids.

9. The apparatus of claim **8**, wherein said spatial discriminator further comprises:

a normalizer, coupled between said contrast transform and said gain control, for applying a weighing factor to each of said plurality of levels of said contrast pyramid to produce a normalized output;

a transducer, coupled to said gain control, for applying a sigmoid non-linearity to said normalized output from said gain control to produce a transducer output; and

a distancer, coupled to said transducer, for computing a distance between a plurality of m-dimensional vectors to produce said image metric, where each of said m-dimensional vectors represents a spatial position of each image of said transducer output.

10. The apparatus of claim **9**, wherein said spatial discriminator further comprises:

a spatially oriented filter, coupled between said contrast transform and said normalizer, for applying orientation